



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

m/s

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,367	07/07/2003	Yonghe Liu	TI-35815	7859
23494	7590	11/30/2006	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			HUYNH, CHUCK	
			ART UNIT	PAPER NUMBER
			2617	
DATE MAILED: 11/30/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/614,367	LIU, YONGHE	
Examiner	Art Unit		
Chuck Huynh	2617		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 09 October 2006.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-13 and 15-19 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-13 and 15-19 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) Notice of Informal Patent Application
6) Other: _____

DETAILED ACTION

1. The Art Unit location of your application in the USPTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Art Unit 2617.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/9/2006 has been entered.

Response to Amendment

1. Claims 1 and 11 have been amended.

Response to Arguments

1. Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that Examiner has misinterpreted “power consumption” as referring to the receiving end's consumption of battery power. This interpretation breaks down when one of the stations is fixed wireless--not powered by battery.

In response, Examiner would like to point out that nowhere in claim 1 does it limit the power consumption to only fixed wireless stations. Therefore, due to the broadness of the claim (i.e. not limiting the claim to pertain to ONLY fixed wireless stations), Examiner's interpretation still stands to reject the claim.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding the newly added limitation “such that the total power consumption of the network is minimized,” Examiner would like to point out the ambiguity of the limitation. It is indeterminate to know how much is the total power consumption of the network minimized, and to what does total power consumption of the network constitute. Therefore, to advance prosecution, Examiner has interpreted the total power consumption to be the total power consumption of the multiple stations that are

minimizing/reducing their power consumption while conserving battery power consumption (Col 3, lines 11-16).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claim 1 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal et al. (US 6072784; hereinafter Agrawal) in view of Benveniste (US 2004/0264397 A1).**

Regarding claim 1, Agrawal discloses a system for saving power in a wireless network, comprising:

an access point (base station) having a priority queue (Col 5, lines 21-23; Col 2, line 59; Col 3, lines 2-6);
at least two stations (Col 2, line 62);
an algorithm for calculating a receiving power consumption of the data transmission for the at least two stations (receiving power consumption signal from

mobiles indication low battery power) (Col 3, lines 20-22) (or it can just be distinguishing between sleep and awake mode for transmission scheduling Col 2, lines 40-45); and

wherein the access point originates and transmits to the at least two stations information having a transmission order (Col 3, lines 35-36) based on the receiving power consumption (is interpreted as the battery power level of mobile terminals received by the access point/ base station) calculation stored within the priority queue of the access point (Col 3, lines 2-14, 23-26, 35-36, 43-49; Col 4, lines 1-11) such that the total power consumption of the network is minimized (Col 3, lines 11-16: wherein mobile stations conserve power consumption by reducing transmitting power level; therefore the total power consumption of all the stations in the network are reduced/minimized), and wherein the at least one of the at least two stations selectively awake from a sleep mode for the data transmission therewith based on the schedule (Col 2, lines 39-45).

Agrawal discloses all the particulars of the claim except the usage of an APSD frame, being sent from an access point to the at least two stations, having schedule information of a data transmission to the at least two stations.

However, Benveniste discloses the usage of an APSD frame, being sent from an access point to the at least two stations, having schedule information of a data transmission to the at least two stations (Page 1, [0016] – [0019]).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Benveniste's disclosure of APSD to improve the scheduling process.

Regarding claim 8, Agrawal discloses all the particulars of the system except the system of claim 1, wherein the transmission order stored in the priority queue of the access point is ordered according to a higher priority assignment for the lowest receiving power consumption (Col 3, lines 2-6, 43-47).

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal in view of Benveniste (US 2004/0264397 A1) in further view of Benveniste (60433604).

Regarding claim 2, Agrawal in view of Benveniste (US 2004/0264397 A1) discloses all the particulars of the claim even an offset to reduce traffic delays and power consumption (Benveniste: Abstract), however does not specifically disclose wherein the access point is configured to generate a TSPEC element comprising a PS interval for specifying a timing offset relative to the current transmission.

However, Benveniste (60433604) does disclose wherein the access point is configured to generate a TSPEC element comprising a PS interval for specifying a timing offset relative to the current transmission (Page 2 and Page 6).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Benveniste's (60433604) disclosure to reduce conflicting channel access and improve power management.

4. Claims 3, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal in view of Benveniste (US 2004/0264397 A1) in further view of Benveniste (60441160).

Regarding claim 3, Agrawal does disclose changing the mobile transmission schedule to accommodate higher priority data (Col 3, line 67 – Col 4, lines 1-7); however Agrawal in view of Benveniste (US 2004/0264397 A1) does not completely disclose the limitation wherein the access point is further operable unicast an APSD frame to the one or more stations to alter one or more of the scheduled wake-up times of the station in response to errors on the network.

However, Benveniste (60441160) does disclose the limitation wherein the access point is further operable unicast an APSD frame to the one or more stations to alter one or more of the scheduled wake-up times of the station in response to errors on the network (Page 5, 3rd paragraph – Page 6).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Benveniste's (60441160) disclosure to reduce lost data.

Regarding claim 4, Agrawal does disclose changing the mobile transmission schedule to accommodate higher priority data (Col 3, line 67 – Col 4, lines 1-7) and the ability to broadcast schedule to mobiles (Fig. 5, step 512); furthermore, Agrawal in view of Benveniste (US 2004/0264397 A1) does disclose the limitation wherein the access point is further operable broadcast (beacon-based) an APSD frame to the at least one of the at least stations (Page 1, [0018-0019]). It would have been obvious to one

ordinarily skilled in the art at the time of invention to incorporate Benveniste's (US 2004/0264397 A1) disclosure of a beacon-based APSD transmission to provide frames to all mobile at once.

However, Agrawal in view of Benveniste (US 2004/0264397 A1) does not completely disclose the limitation to alter one or more of the scheduled wake-up times of the station in response to errors on the network.

However, Benveniste (60441160) does disclose the limitation to alter one or more of the scheduled wake-up times of the station in response to errors on the network (Page 5, 3rd paragraph – Page 6).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Benveniste's (60441160) disclosure to reduce data loss.

Regarding claim 5, it is rejected similarly to claim 3 and 4. The limitation wherein the access point and priority queue is operable to allow the access point to ignore current scheduling activities is interpreted to mean making a new schedule and ignoring the old schedule (similar to claim 3 and 4 in that the schedule is altered/updated and the previous schedule is ignored) and the limitation to perform scheduling in response to errors on the network and to the arrival of higher priority data has been rejected in claim 3 and 4.

5. Claim 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal in view of Benveniste (US 2004/0264397 A1) in further view of Agrawal.

Regarding claim 6, Agrawal in view of Benveniste (US 2004/0264397 A1) discloses the calculation of receiving power to be battery power of mobile stations (Col 2, lines 1-6; Col 11, lines 34-39) and does not clearly disclose the system of claim 1, wherein the algorithm for calculating the receiving power consumption of downlink data for the stations is a function of one of a rate of the data transmission, a packet size of the data transmitted, a transmission time of the data transmitted, a packet length, a number of the packets in the transmission, and a combination thereof.

However, Agrawal does disclose wherein the algorithm for calculating the receiving power consumption of downlink data for the stations is a function of one of a rate of the data transmission, a packet size of the data transmitted, a transmission time of the data transmitted (Col 5, lines 54-67), a packet length, a number of the packets in the transmission, and a combination thereof.

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Agrawal's disclosure to calculate the receiving power consumption with accordance to the transmission time of the data transmitted to prioritize receiving power management.

Regarding claim 7, Agrawal in view of Benveniste (US 2004/0264397 A1) discloses all the particulars of the claim except the system of claim 1, wherein the algorithm is further operable to aggregate together a plurality of low power transmissions comprising all currently scheduled data to a PS station before calculating the receiving power consumption.

However, Agrawal does disclose the system of claim 1, wherein the algorithm is further operable to aggregate together a plurality of low power transmissions comprising all currently scheduled data to a PS station before calculating the receiving power consumption (Col 1, lines 62-67 – Col 2, lines 1-3)

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Agrawal's disclosure to improve power management.

6. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal in view of Benveniste in further view of Uehara.

Regarding claim 9, Agrawal in view of Benveniste (US 2004/0264397 A1) discloses all the particulars of the claim except the system of claim 1, wherein the priority queue of the access point is operable to order and enable the lowest transmission power downlink first.

However, Uehara discloses the limitation wherein the priority queue of the access point is operable to order and enable the lowest transmission power downlink first (Col 3, lines 50-59; Col 4, lines 1-11).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Uehara's disclosure of a transmission order from lowest transmission power to highest to better prioritize transmission.

Regarding claim 10, Agrawal in view of Benveniste (US 2004/0264397 A1) discloses all the particulars of the claim except wherein the priority queue is further operable to order subsequent transmissions but does not disclose based on which transmission has the lowest transmission power.

However, Uehara does disclose the limitation wherein the priority queue is further operable to order subsequent transmissions but does not disclose based on which transmission has the lowest transmission power (Col 3, lines 50-59; Col 4, lines 1-11).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Uehara's disclosure of a transmission order from lowest transmission power to highest to better prioritize transmission.

7. Claims 11, 12, 13, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal et al. (US 6072784; hereinafter Agrawal) in view of Van Bokhorst et al. (US 6192230; hereinafter Van Bokhorst).

Regarding claim 11, Agrawal discloses a method of saving power in a wireless network comprising an access point; one or more stations, the method comprising:

calculating receiving power consumption of the data to be transmitted to respective stations (receiving power consumption signal from mobiles indication low battery power) (Col 3, lines 20-22) (or it can just be distinguishing between sleep and awake mode for transmission scheduling Col 2, lines 40-45);

determining a priority queue ordering of the transmissions based on the receiving power consumption (is interpreted as the battery power level of mobile terminals received by the access point/ base station) calculated for each station (Col 3, lines 2-14, 23-26, 35-36, 43-49; Col 4, lines 1-11) such that the total power consumption of the network is minimized (Col 3, lines 11-16: wherein mobile stations conserve power consumption by reducing transmitting power level; therefore the total power consumption of all the stations in the network are reduced/minimized);

scheduling the data transmission for each station based on the transmission order (Col 3, lines 2-14, 23-26, 35-36, 43-49; Col 4, lines 1-11);

transmitting the data to the one or more stations according to the schedule (Col 3, lines 2-14, 23-26, 35-36, 43-49; Col 4, lines 1-11).

Agrawal discloses all the particulars of the claim, but is unclear on how to communicate the schedule of the data transmission to each station.

However, Van Bokhorst does disclose communicating the schedule of the data transmission to each station using TIM-messages (Col 5, lines 18-49).

It would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Van Bokhorst's disclosure to improve awareness between access point and mobile stations when scheduling data transmission.

Regarding claim 12, Van Bokhorst discloses the method of claim 11, further comprising:

determining whether the frame queue is empty in the access point (determining whether there is any data to transmit) (Col 5, lines 18-28, 57-62);

informing the corresponding station about the end of transmission if the frame queue is empty in the access point (there is no data for transmission to any stations) (Col 5, lines 57-62);

disabling the transmission until the next beacon (no data transmission until next TIM) (Col 5, lines 18-28, 57-62); and

returning the corresponding station to the sleep mode until the next beacon (Col 5, lines 18-28, 57-62).

Regarding claim 13, Van Bokhorst discloses the method of claim 11, further comprising:

awaking a station from a sleep mode to monitor a beacon from the access point (Col 5, lines 25-29);

determining whether the station's association ID is indicated in the beacon (TIM has the mobile address Col 4, lines 53-65) (determining which stations has messages for transmission, in this case station 2 has a message for transmission, so stations 1,3, and 4 are to return to sleep mode) (Col 6, lines 3-9) ;

returning the station to the sleep mode if the station's association ID is not indicated (stations 1,3 and 4 return to doze mode) (Col 6, lines 5-6);
decoding the frames on the wireless channel (is well known in the art to receiving data transmission) (Col 6, lines 7-8); and

returning the station to the sleep mode until the next beacon, if the station's association ID matches in a frame and a MORE-DATA bit is set to zero (this is referred to as the "back-to-doze" mode Col 6, line 21; after respective stations have received their respective data, respective stations return to doze mode Col 6, lines 27-33).

Regarding claim 17, Van Bokhorst discloses the method of claim 13, wherein awaking the station to monitor a beacon from the access point, comprises awaking the station at a periodic interval (every TIM interval Col 5, line 10) to monitor a beacon from the access point (Col 5, lines 18-30).

Regarding claim 18, Van Bokhorst discloses the method of claim 13, wherein determining whether a station's association ID is indicated, comprises determining whether a stations association ID is indicated within a TIM of the beacon (Col 4, lines 40-52).

8. Claim 15, 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agrawal in view of Bokhorst in further view of Benveniste (60441160).

Regarding claim 15, Van Bokhorst discloses the method of claim 13, further comprising:

determining whether downlink data is to be transmitted from the access point to the station if the station's association ID is indicated in the beacon (Col 4, lines 40-52; Col 5, lines 30-49);

keeping the station awake until the next TIM message containing schedule data is received (Col 5, lines 1-16; 43-45).

Agrawal in view of Bokhorst discloses all the particulars of the claim except the usage of an APSD frame.

However, Benveniste (60441160) discloses the usage of APSD is well known in the art of power-saving (Page 4, 2nd paragraph of Power Saving section).

Therefore, it would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate using an APSD frame to schedule data within a power-saving environment.

Regarding claim 16, Van Bokhorst discloses the method of claim 15, further comprising returning the station to sleep mode after receipt of the TIM (message) (in Col 5, lines 50-57 station returns to doze mode when TIM-3 has no message for it), and maintaining the station in sleep mode until the schedule data dictates that the station

awaken (station 2 remains in sleep mode until station 2 is to receive a message at TIM-6 in Col 6, lines 3-9).

Agrawal in view of Bokhorst discloses all the particulars of the claim except the usage of an APSD frame.

However, Benveniste (60441160) discloses the usage of APSD is well known in the art of power-saving (Page 4, 2nd paragraph of Power Saving section).

Therefore, it would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate using an APSD frame to schedule data within a power-saving environment.

Regarding claim 19, Van Bokhorst discloses the method of claim 11, further comprising:

allowing the station to go into sleep mode until the next beacon (until the next TIM) (Col 5, lines 18-30).

Agrawal in view of Van Bokhorst discloses all the particulars of the claim except scheduling an activation delay (offset) of the data transmission in an APSD frame for each station based on the transmission order;

sending out the APSD frames containing the schedule data; and
clearing a MORE-DATA field in the last packet of the priority queue.

However, Benveniste (60441160) does disclose:

scheduling an activation delay (offset) of the data transmission in an APSD frame for each station based on the transmission order (activation delay is like an offset to avoid clients waking up at the same time, Page 5, 2nd –3rd paragraph);

which would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate Benveniste's disclosure to prevent multiple station from having the same wake up time;

sending out the APSD frames containing the schedule data (Page 4, Section: Power Saving, paragraph 2)

which would have been obvious to one ordinarily skilled in the art at the time of invention to incorporate using an APSD frame to schedule data within a power-saving environment;

clearing a MORE-DATA field in the last packet of the priority queue (no data messages) (Page 5, Section: Lost Acknowledgements to Downlink Frames, 1st paragraph; it is disclose that the More Data Bit is turned ON or is nonzero when there is still data, therefore it is well known in the art that when there is no data the bit would be zero or in binary terms, cleared).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuck Huynh whose telephone number is 571-272-7866. The examiner can normally be reached on M-F 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duc Nguyen can be reached on 571-272-7503. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Chuck Huynh


DUC M. NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600